

REMARKS**INTRODUCTION:**

In accordance with the foregoing, claims 7, 9 and 12 have been canceled without prejudice or disclaimer, and claim 1 has been amended. No new matter is being presented, and approval and entry are respectfully requested.

Claims 1-6, 8, and 10-11 are pending and under consideration. Reconsideration is respectfully requested.

OBJECTION TO THE CLAIMS:

In the Office Action, at page 2, numbered paragraphs 1 and 2, claims 7 and 9 were objected to as being duplicative.

Claims 7 and 9 have been cancelled without prejudice or disclaimer. Hence, the outstanding objection to claims 7 and 9 has been resolved.

REJECTION UNDER 35 U.S.C. §102, §103:

A. In the Office Action, at pages 2-3, numbered paragraph 4, claims 1, 2 and 4-12 were rejected under 35 U.S.C. §103(a) as being unpatentable over Dontula et al. (USPN 6,841,226; hereafter, Dontula) in view of Hasegawa et al. (J. Appl. Polym. Sci., 1998; hereafter, Hasegawa), and further in view of extrinsic evidence furnished in Anno et al. (USPN 6,475,690; hereafter, Anno). The reasons for the rejection are set forth in the Office Action and therefore not repeated. The rejection is traversed and reconsideration is requested.

Independent claim 1 has been amended to include the features of claim 12, and claim 12 has been canceled without prejudice or disclaimer. Claims 7 and 9 have also been canceled.

It is respectfully submitted that, as admitted by the Examiner, Dontula does not teach the use of modified polyolefin. The present invention utilizes a modified polyolefin.

Also, as admitted by the Examiner, Hasegawa teaches using maleic anhydride polypropylene oligomer as a compatibilizing agent (see Hasegawa, p. 87). In contrast, the present invention utilizes maleic acid modified olefin oligomers as the compatibilizing agent, for example, Hi-wax™ 2203A is preferred, and Hi-wax™ 1105A may be utilized (see specification, page 10, lines 1-4) as maleic acid modified olefin oligomers. Maleic anhydride is a nearly planar molecule with the ring oxygen atom lying 0.003 nm out of the molecular plane. A twofold rotation axis bisects the double bond and passes through the ring oxygen atom. Maleic acid has an intramolecular hydrogen bond that counts for both the ease of removal of the first carboxyl

proton and the small dissociation constant for maleic acid. Maleic acid is a planar molecule with packing within the lattice into extended chains in which carboxyl groups interlink by O-H...O bonds into cyclic pairs. The table below, from Maleic Anhydride, Maleic Acid, and Fumaric Acid, by Timothy R. Felthouse et al., Huntsman Petrochemical Corporation, Austin Laboratories, 7114 North Lamar Boulevard, Austin, Texas, published online at <http://www.southalabama.edu/chemistry/barletta/felthouse.pdf> on April 26, 2001, shows differences between maleic acid and maleic anhydride, which Applicant asserts provide for different chemical reactions:

Table 1. Physical Properties of Maleic Anhydride, Maleic Acid, and Fumaric Acid

Property	Maleic Anhydride	Maleic Acid	Fumaric Acid	Ref.
formula	C ₄ H ₂ O ₃	C ₄ H ₄ O ₄	C ₄ H ₄ O ₄	
formula weight	98.06	116.07	116.07	
mp, °C	52.85	138-139 ^a 130-130.5 ^b 144 (air)	287	3,4
bp, °C	202	ca 138 (dec)	282 (air) 290	5 4
sp gr, at 20/20°C, solid	1.48 ^c	1.590	1.635	4
molar volume		81	79	7
heat of formation, kJ/mol ^d	-470.41	-790.57	-811.03	8
free energy of formation, kJ/mol ^d		-625.09	-655.63	
heat of combustion, kJ/mol ^d	-1389.5	-1355.2	-1334.7	8
heat of hydrogenation, kJ/mol ^d		-153.2	-130.3	8
heat capacity, kJ/(K mol) ^d				
solid	0.1199	0.1356	0.1418	8
liquid	0.164			
heat of sublimation, kJ/mol ^d	71.5	105.4	123.6	8
heat of vaporization, kJ/mol ^d	54.8			8
heat of fusion, kJ/mol ^d	13.55			8
heat of hydrolysis, kJ/mol ^d	-34.9			8
dipole moment, 10 ⁻³⁰ C·m ^e	13.2	10.6	8.17	9
crystalline form	orthorhombic	monoclinic	monoclinic prismatic, needles, or leaflets	10,15,17,18
space group	P2 ₁ 2 ₁ 2 ₁	P2 ₁ /c	P2 ₁ /c P $\bar{1}$	10,15,17,18
a, nm	0.5322	0.7473	0.7619 0.5264	
b, nm	0.7009	1.0098	1.5014 0.7618	
c, nm	1.0987	0.7627	0.6686 0.4487	
α, deg	90	90	90 106.85	
β, deg	90	123.59	112.0 86.33	
γ, deg	90	90	90 134.94	
dissociation constant, at 25°C				20
K ₁		1.14 × 10 ⁻²	9.57 × 10 ⁻⁴	
K ₂		5.95 × 10 ⁻⁷	4.13 × 10 ⁻⁵	
heat of neutralization, KJ/mol ^d	126.9			6

^a Crystallized from water.^b Crystallized from alcohol; sublimes at 165°C at 0.23 kPa.

^c Specific gravity at 70/70°C, molten = 1.3 (6).

^d To convert kJ to kcal, divide by 4.184.

^e In dioxane at 25°C. To convert C•m to debye, divide by 3.336×10^{-30} .

Hence, Hasegawa and the present invention utilize compatibilizing agents modified with different agents, and Hasegawa teaches away from amended independent claim 1 of the present invention.

It should be noted that in addition to utilizing compatibilizing agents modified with different agents, in the present invention, the characteristics of the acid modified olefin oligomers of the present invention are different from the characteristics of Hasegawa (see Hasegawa and Kangshin ASCPI Newsletter, published online at [http://www.kangshin.co.kr/ASCPI/EC%A0%9C20%ED%98%B8%20Mitsui %20Hi-Wax.pdf](http://www.kangshin.co.kr/ASCPI/EC%A0%9C20%ED%98%B8%20Mitsui%20Hi-Wax.pdf) on February 14, 2000, recited below (arrows added to show citations for Hi-Wax™2203A and Hi-Wax™ 1105A) for the convenience of the Examiner):

Kangshin ASCPI Newsletter

제 20호 2000년 2월 14일
작성자 : 서울사무소 김정필

제 목 : Mitsui Hi -Wax

1. 특징

Mitsui Hi-Wax는 저분자량 polyethylene으로 다음과 같은 특징을 가지고 있습니다.

- 1) 높은 녹는점과 연화점
- 2) 뛰어난 내열성, 열안정성
- 3) Polyethylene과 동일한 정도, 분산과 분쇄가 용이
- 4) 뛰어난 내약품성, 전기절연성
- 5) 극성폴리머, 무기물, 금속류등에 대한 높은 친화성

2. Grade 및 기본물성

뒷면 참조

3. 특성 및 용도

용도	기능	효과	추천 Grade
Paint Modifier	표면개질제	뛰어난 소광효과, 도막균일방지 고급스러운 느낌과 함께 내구성 향상	405MP, 4051E, 1105A 2203A, NP105, NP805
Lusting Agent	표면개질제	뛰어난 광택, 도막 물성향상 자동차 왁스, 마루 왁스의 기능성 향상	405MP, 4051E
Pigment Dispersant	상용성 향상제	안료와 상용성이 뛰어나 안료의 분산성 향상 고농축 Master batch 제작가능	NL500, NL800, 420P
PVC Slip Agent	Slip 향상제	뛰어난 slip효과, 장기간 지속적 효과 유지 생산성 향상, 에너지 절감	220MP, 4202E, 4051E
Mold Releasing Agent	이형성 향상제	열경화성, 열가소성수지의 이형성 향상 사출 작업성 향상, Molding cycle 향상	200P, 400P, 1140H 1160H
Rubber Processing Aid	이형성 향상제 점도 조절제 상용성 향상제	이형성, 흐름성 개선 충진제 및 안료의 분산성 향상 사출 작업성 향상, Molding cycle 향상	110P, NL100
Plain Paper Toner	이형성 향상제	Anti-offset to a fixing roll Picture clearness 향상	NP055, NP105, NP505
Paper Quality Improver	Slip 향상제 표면개질제	내습성, 광택, 표면경도 향상 Blocking 방지, 금획 방지 고급스러운 느낌과 함께 내구성 향상	NP055, NP105, NP805 4202E
Printing Ink 균일방지	내균일성 향상 내열성 향상	Printing ink표면의 균일 방지, 내열성 향상 Printing ink clearness 향상	220MP, 405MP, NP055 NP105, NP805
Textile Processing Aid	Slip 향상제 유연성 향상제	Textile에 Resin처리시 Slip성, 유연성향상 고속제봉 가능, Tear strength향상	4202E, 4051E, 1105A 2203A
Hot-melt Additive	내열성 향상 점도 조절제	내열성, 흐름성향상 자동차, 건축물등 내열성이 요구되는 분야	200P, NP055, NP105
Electical Insulation	전기절연성 향상 내열성 향상	뛰어난 전기절연성, 연화점 향상 Film condenser의 전기절연성 향상	200P
양초, 크레용 개선제	표면개질제	표면경도 증가, 연화점 향상 Natural wax compounding agent	110P, NL100

기타 자세한 문의 사항은 가까운 삼성 선원(주)과 각 사무소 시내 연락처로 연락 바랍니다.

강신산업 (주) 대표이사 박정훈

사무소	사내 연락처	전화	팩스	주소	Homepage
서울 사무소	김정필	(02) 920-4073	(02) 929-8900	서울 영등포구 문신동 2가 167(강신빌딩)	http://www.kangshin.co.kr
부산 사무소	정현배	(051) 894-9800	(051) 893-7600	부산 부산진구 개금동 408-18	ksseoul@kangshin.co.kr
대구 사무소	이오영	(053) 654-2900	(053) 626-6200	대구 남구 대명 6동 942-4	kspusan@kangshin.co.kr
인천 사무소	황현선	(032) 575-1800	(032) 575-1700	인천 서구 가좌동 151-35	kstaegu@kangshin.co.kr ksinchon@kangshin.co.kr

간주 : 남 원오

Working : 평일 9:00 - 12:00 - 12:00 - 4:30pm

Eating : 평일 7:14 - 10:00 - 10:00 - 4:30pm

Hi-Wax Grade & Physical Property

1. Polymerization Type

	High Density Type					Low Density Type					
	800P	400P	200P	100P	720P	410P	420P	320P	210P	220P	110P
Molecular Weight	8000	4000	2000	900	7200	4000	4000	3000	2000	2000	1000
Density kg/m ³	970	980	970	950	920	950	930	930	940	920	920
Acid Value KOH mg/g											
Crystallinity %	84	85	87	90	60	80	70	65	75	70	80
Melting Point °C	127	126	122	116	113	118	113	109	114	110	109
Softening Point °C	140	136	130	121	118	122	118	114	120	113	113
Hardness 1/10mm (penetration test)	11	11	1	2	3	2	3	7	4	13	25
Melt Viscosity mPa.S	8000	650	80	15	6000	650	650	250	80	80	20
특징	고밀도, 고결정화도					저밀도, 저결정화도					
	고경도, 고연화점					저경도, 저연화점					

2. Modified Type

			Acid Value Type							Acid Modified		Special Monomer Modi		
	4.5MP	310MP	320MP	210MP	220MP	4051E	4502E	4202E	1105A	2203A	1120H	1140H	1160H	
Molecular Weight	4000	3000	3000	2000	2000	3200	3200	2600	1500	2700	1200	2100	1500	
Density kg/m ³	960	940	930	940	930	970	980	950	940	930	940	970	1000	
Acid Value KOH mg/g	1	1	1	1	1	12	20	17	60	30				
Crystallinity %	80	80	70	75	65	74	75	62	60	65	58	45	30	
Melting Point °C	121	114	107	112	107	115	110	100	104	107	107	102	104	
Softening Point °C	128	122	114	118	113	120	115	107	108	111	108	103	105	
Hardness 1/10mm (penetration test)	1	3	7	3	14	1	4	5	6	3	7	2	1	
Melt Viscosity mPa.S	650	250	250	80	80	500	550	300	150	300	40	300	1100	
특징	극성 폴리머, 무기물, 금속류와 뛰어난 친화성								Alcohols, Amines, Isocyanates		Polyethylene, PS, ABS.			
	에틸렌화 가능 (High Acid Value Grade)								nates류, Oligomer를		Polyester등과 뛰어난 혼화			
									가전 Epoxy와 반응					

3. Thermally Cracking Type

	Low Density Polyethylene				Polypropylene			
	NL100	NL200	NL500	NL800	NP055	NP105	NP505	NP805
Molecular Weight	2400	2800	4300	6400	700	10000	19000	29000
Density kg/m ³	920	920	920	920	900	900	900	900
Acid Value KOH mg/g								
Crystallinity %	54	54	54	52	60	64	60	80
Melting Point °C	110/103	104	105	105	136/145	140/148	140/150	145/152
Softening Point °C	110	110	110	111	148	150	154	156
Hardness 1/10mm (penetration test)	3	3	3	3	1	11	11	11
Melt Viscosity mPa.S	200	300	1000	3700	50(180°C)	150(180°C)	650(180°C)	2300(180°C)
특징	매우 낮은 결정화도				상승된 연화점, 높은 온도			
	다른 수지들과 상용성이 뛰어나				가장 높은 녹는점			

기타 자세한 문의 사항은 가까운 강신산업(주)의 각 사옥에 사내 연락처로 연락 바랍니다.

강신산업(주) 대표이사 박 불 군

사옥소	사내 연락처	전화	팩스	주소	Homepage
서울 사옥소	원경원	(02) 920-4000	(02) 929-8900	서울 성북구 불선동 2가 167(강신빌딩)	http://www.kangshin.co.kr
부산 사옥소	정현배	(051) 894-9800	(051) 893-7600	부산 사상구 개령동 436-18	ksseoul@kangshin.co.kr
대구 사옥소	최모영	(053) 654-2900	(053) 626-6200	대구 남구 대명 6동 942-4	ksbusan@kangshin.co.kr
인천 사옥소	황현진	(032) 575-1800	(032) 575-1700	인천 서구 가좌동 151-35	ksdaegu@kangshin.co.kr
					ksincheon@kangshin.co.kr

단위 : mm
 Weight : 강판 2/12 mm (200 - 1200) = 180mm
 Edging : 강판 2/14 mm (200 - 1000) = 40mm

For example, Hasegawa (see page 87 of Hasegawa) uses a maleic anhydride-modified polypropylene oligomer that has an acid value of 52 mg KOH/g, a softening temperature of 145°C and a molecular weight of 30,000. In contrast, in the present invention, the maleic acid modified olefin oligomers 1105A and 2203A, respectively, have acid values of 60 and 30 mg KOH/g, softening temperatures of 108°C and 111°C, and molecular weights of 1500 and 2700, respectively.

At col. 15, line 24, Anno affirms that 2203 A (softening point 111.degree. C., acid value 30), made by Mitsui Chemicals, Inc. may be utilized as a releasant wax in combination with at least one other kind of wax, as is recited in col. 14, line 42 through col. 15, line 10 of Anno, recited below for the convenience of the Examiner:

In the present invention, it is preferable to use two or more kinds of waxes having different melting points. The melting point difference between two kinds of waxes is at least not less than 20°C., preferably not less than 30°C., more preferably not less than 40°C. When two or more kinds of waxes having different melting points are jointly used, it is easy to maintain a separability between the fixing apparatus and a media in the wide temperature range. From the viewpoint of more increase of the offset resistance and the like, it is preferable to add polypropylene wax as one kind of wax. Particularly, it is preferable to employ polypropylene wax as a high melting point wax. It is preferable to add polyethylene wax as a low melting point wax to the toner from the viewpoint of improving the smear phenomenon wherein the deteriorations of the image quality, such as a blot and a stain of the images and the like which are caused by the rubbing of the images with the roller at the time of automatically sending a manuscript or at the time of sending the paper whose one side has already been imaged in case of copying both sides of a paper. As a polypropylene wax, the polypropylene wax which has a melt viscosity of 50-300 cps/160°C., a softening point of 130-160°C. and an acid value of 1-20 KOHmg/g is exemplified. Besides the aforementioned polyethylene wax, various kinds of natural wax, Fischer-Tropsch wax, montan acid wax, ester wax and paraffin wax can suitably be employed as a low melting point wax. Particularly, it is preferable to use montan acid wax and ester wax. The polypropylene wax having the aforesaid melt viscosity, softening point and acid value exhibits and excellent dispersibility to the aforesaid binder resin (A), and achieves the increase of offset resistance without bringing about the problem caused by the liberated wax. It is preferable to use an oxidized-type wax when the polyester resin in particular is employed as the binder resin. (emphasis added)

Anno teaches the use of a combination of waxes, which may include Hi-wax 2203A (but which is not utilized alone) as a combination releasant wax to maintain a separability between the fixing apparatus and a media in a wide temperature range. In contrast, the present invention utilizes a single maleic acid modified olefin oligomer, e.g., Hi-wax 2203A alone, as the compatibilizing agent to provide high heat resistance and flame retardancy, i.e., to strengthen the resin composition against heat and flames. Thus, Anno teaches away from the present invention.

Thus, even if combined, Dontula, Anno and Hasegawa do not teach or suggest amended independent claim 1 of the present invention, or the claims depending therefrom.

Hence, it is respectfully submitted that amended independent claim 1 of the present invention is patentable under 35 U.S.C. §103(a) over Dontula et al. (USPN 6,841,226) in view of Hasegawa et al. (J. Appl. Polym. Sci., 1998) and further in view of extrinsic evidence furnished in Anno et al. (USPN 6,475,690), alone or in combination. Since claims 2, 4-6, 8 and 10-11 depend from amended independent claim 1 of the present invention, claims 2, 4-6, 8 and 10-11 are patentable under 35 U.S.C. §103(a) over Dontula et al. (USPN 6,841,226) in view of Hasegawa et al. (J. Appl. Polym. Sci., 1998) and further in view of extrinsic evidence furnished in Anno et al. (USPN 6,475,690), alone or in combination for at least the reasons amended independent claim 1 is patentable under 35 U.S.C. §103(a) over Dontula et al. (USPN 6,841,226) in view of Hasegawa et al. (J. Appl. Polym. Sci., 1998) and further in view of extrinsic evidence furnished in Anno et al. (USPN 6,475,690), alone or in combination.

B. In the Office Action, at pages 4-5, numbered paragraph 5, claims 1, 2 and 4-12 were rejected under 35 U.S.C. §103(a) as being unpatentable over Dontula et al. (USPN 6,841,226; hereafter, Dontula) over Mehta et al. (USPN 6,844,389; hereafter, Mehta). The reasons for the rejection are set forth in the Office Action and therefore not repeated. The rejection is traversed and reconsideration is requested.

As noted above, independent claim 1 has been amended to include the features of claim 12, and claim 12 has been canceled without prejudice or disclaimer. Claims 7 and 9 have also been canceled.

As noted above, the Examiner admits that Dontula does not teach the use of modified polyolefin. The present invention utilizes a modified polyolefin.

As stated in col. 6, lines 39-50 of Mehta, recited below for the convenience of the Examiner, Mehta teaches the use of maleic anhydride as a preferred monomer for a compatibilizing agent, in contrast to amended independent claim 1 of the present invention, which recites the use of a maleic acid modified polyolefin resin:

Maleic anhydride is a preferred monomer for these compatibilizing agents and it is particularly advantageous when the maleic anhydride is grafted on the ethylene polymer. When the ethylenically unsaturated carboxylic acid or acid derivative monomer is grafted, and particularly when grafting maleic anhydride, the ethylene polymer compatibilizing agent will preferably contain about 0.2 to 4 weight percent of the grafting monomer. In general, the same types of ethylene polymers employed as the base resin for the composite compositions can be grafted and used as the compatibilizing agent. This includes both ethylene homopolymers and copolymers. (emphasis added)

Hence, it is respectfully submitted that Mehta teaches away from amended independent claim 1 of the present invention.

Thus, even if combined Dontula and Mehta do not teach or suggest amended independent claim 1 of the present invention.

Hence, it is respectfully submitted that amended independent claim 1 of the present invention is patentable under 35 U.S.C. §103(a) over Dontula et al. (USPN 6,841,226) over Mehta et al. (USPN 6,844,389), alone or in combination. Since claims 2, 4-6, 8 and 10-11 depend from amended independent claim 1 of the present invention, claims 2, 4-6, 8 and 10-11 are patentable under 35 U.S.C. §103(a) over Dontula et al. (USPN 6,841,226) over Mehta et al. (USPN 6,844,389), alone or in combination, for at least the reasons amended independent claim 1 is patentable under 35 U.S.C. §103(a) over Dontula et al. (USPN 6,841,226) over Mehta et al. (USPN 6,844,389), alone or in combination.

C. In the Office Action, at page 5, numbered paragraph 6, claims 1, 2 and 4-12 were rejected under 35 U.S.C. §102(e) as being anticipated by, or in the alternative, under 35 U.S.C. §103(a) as being unpatentable over Mehta et al. (USPN 6,844,389; hereafter, Mehta). The reasons for the rejection are set forth in the Office Action and therefore not repeated. The rejection is traversed and reconsideration is requested.

Independent claim 1 has been amended to include the features of claim 12, and claim 12 has been canceled without prejudice or disclaimer. Amended independent claim 1 is no longer in a product by process form. Claims 7 and 9 have also been canceled.

As noted above, Mehta teaches away from amended independent claim 1 of the present invention for at least the reason that Mehta teaches the use of maleic anhydride as a preferred monomer for a compatibilizing agent, in contrast to amended independent claim 1 of the present invention, which recites the use of a maleic acid modified polyolefin resin, i.e., amended independent claim 1 of the present invention utilizes maleic acid as a compatibilizing agent.

Anticipation requires a lack of novelty of the invention as claimed. The invention must have been known to the art in the detail of the claim; that is, all of the elements and limitations of the claim must be shown in a single prior reference, arranged as in the claim. See C.R. Bard, Inc. v. M3 Systems, Inc., 157 F.3d 1340, 1349, 48 USPQ2d 1225, 1229-30 (Fed. Cir. 1998); Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Hence, it is respectfully submitted that amended independent claim 1 of the present invention is not anticipated under 35 U.S.C. §102(e) by Mehta et al. (USPN 6,844,389). Since claims 2, 4-6, 8 and 10-11 depend from amended independent claim 1 of the present invention, claims 2, 4-6, 8 and 10-11 are not anticipated under 35 U.S.C. §102(e) by Mehta et al. (USPN 6,844,389) for at least the reasons amended independent claim 1 is not anticipated under 35 U.S.C. §102(e) by Mehta et al. (USPN 6,844,389).

As noted above, Mehta teaches away from amended independent claim 1 of the present invention by teaching the use of maleic anhydride as a preferred monomer for a compatibilizing agent, in contrast to amended independent claim 1 of the present invention, which recites the use of a maleic acid modified polyolefin resin, i.e., amended independent claim 1 of the present invention utilizes maleic acid as a compatibilizing agent.

Hence, it is respectfully submitted that there is no reasonable basis to believe that Mehta's spectral properties are the same as those of the present invention.

Thus, it is respectfully submitted that amended independent claim 1 of the present invention is patentable under 35 U.S.C. §103(a) over Mehta et al. (USPN 6,844,389). Since claims 2, 4-6, 8 and 10-11 depend from amended independent claim 1 of the present invention, claims 2, 4-6, 8 and 10-11 are patentable under 35 U.S.C. §103(a) over Mehta et al. (USPN 6,844,389) for at least the reasons amended independent claim 1 is patentable under 35 U.S.C. §103(a) over Mehta et al. (USPN 6,844,389).

D. In the Office Action, at page 6, numbered paragraph 7, claims 1, 2, 5, 8, 11 and 12 were rejected under 35 U.S.C. §102(b) as being anticipated by, or in the alternative, under 35 U.S.C. §103(a) as being obvious over Kurokawa et al. (Since the Examiner recited J. Mat. Sci. Letts., the rejection under 35 U.S.C. §102(b) is taken to be a rejection as being anticipated by Kurokawa, and since the rejection on page 6 also recites Mehta, the rejection under 35 U.S.C. §103(a) is taken as being a rejection as being obvious over Kurokawa and Mehta) (J. Mat. Sci. Letts., 1996; hereafter, Kurokawa) The reasons for the rejection are set forth in the Office Action and therefore not repeated. The rejection is traversed and reconsideration is requested.

In the present invention, for example, Example 1 on pages 14-15 of the specification, the polyolefin resin composition is prepared as follows:

Example 1

4 g of organic modified montmorillonite Nanomer™ 1.30P manufactured by Nanocore Technology Corp. was used as modified layered silicate, and 16 g of Hi-wax™ 2203A manufactured by Mitsui Chemicals, Inc. was used as the modified polyolefin resin. Powdered modified layered silicate and powdered modified polyolefin resin were mixed at 120°C for 5 minutes using a Labo Plastomill™ MR50 Type kneader manufactured by Toyo Seiki Co., Ltd. To the resultant mixture, 80 g of high-density polyethylene resin S360 manufactured by Asahi Kasei Corp. was added as a polyolefin resin. Then, further kneading was performed for 10 minutes to obtain a polyolefin resin composition. The kneading conditions are as follows:

Rotating speed: 50 rpm

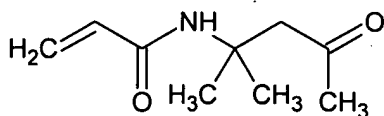
Temperature: 180°C

The resultant composition was compressed under pressure at 180°C and quickly cooled. Then, the resultant was stretched to be 3×3 times using a batch type bi-axial stretching apparatus to obtain a film having a thickness of about 30 μm.

Using the resultant film, HRR and heat distortion temperature were evaluated, and the results are shown in Table 1. In addition, the infrared absorption spectrum of the modified polyolefin resin used in the present invention is shown in Figs. 1 and 2. The X-ray diffraction pattern of the resultant polyolefin resin composition film is shown by the "pattern a" in Fig. 5 and that of the raw material modified layered silicate is shown by the "pattern d" in Fig. 5.

Note that no diacetone acrylamide is utilized in the present invention.

It is respectfully submitted that Kurokawa teaches the use of DAAM, i.e., diacetone acrylamide, or N-(1,1-dimethyl-3-oxobutyl)-acrylamide, which is represented by the chemical structure $\text{CH}_2=\text{CHC}(\text{O})\text{NHC}(\text{CH}_3)_2\text{CH}_2\text{C}(\text{O})\text{CH}_3$, molecular weight 169.2, shown below.



Kurokawa teaches (see pages 1482-1483 of Kurokawa) that polypropylene (PP) is blended with smectite after dispersion in another resin with larger polarity and a high affinity for PP. In the example set forth in Kurokawa (pp. 1482-1483 of Kurokawa), a clay mineral (SAN) is dispersed with toluene, then a toluene solution of catalyst (isobutyronitrile) is added, and diacetone acrylamide (DAAM) is mixed to obtain intercalation, then is placed under a nitrogen atmosphere to polymerize the intercalated DAAM with the catalyst and to form a sol. After polymerization, the sol is mixed with maleic acid modified PP (m-PP) dissolved in toluene, cooled, placed in methanol and washed with methanol. The composite is blended with PP to be 3 wt% of the filler content.

Clearly, Kurokawa's reaction is different from the reaction of amended independent claim 1 of the present invention. Hence, Kurokawa teaches away from amended independent claim 1 of the present invention.

As noted above, anticipation requires a lack of novelty of the invention as claimed. The invention must have been known to the art in the detail of the claim; that is, all of the elements and limitations of the claim must be shown in a single prior reference, arranged as in the claim (see references above).

Thus, it is respectfully submitted that amended independent claim 1 of the present invention is not anticipated under 35 U.S.C. §102(b) as being anticipated by Kurokawa et al.

Kurokawa teaches the use of maleic acid modified PP, whereas Mehta teaches the use of maleic anhydride modified ethylene polymer. Hence, there is no teaching or suggestion of combining Kurokawa and Mehta.

Since both Kurokawa and Mehta teach away from the present invention, it is respectfully submitted that amended independent claim 1 of the present invention is patentable under 35 U.S.C. §103(a) over Kurokawa et al. (J. Mat. Sci. Letts., 1996) and Mehta (USPN 6,844,389), alone or in combination. Since claims 2, 5, 8, and 11 depend from amended independent claim 1 of the present invention, claims 2, 5, 8, and 11 are patentable under 35 U.S.C. §103(a) over Kurokawa et al. (J. Mat. Sci. Letts., 1996) and Mehta (USPN 6,844,389), alone or in combination, for at least the reasons amended independent claim 1 is patentable under 35 U.S.C. §103(a) over Kurokawa et al. (J. Mat. Sci. Letts., 1996) and Mehta (USPN 6,844,389), alone or in combination.

CONCLUSION:

In accordance with the foregoing, it is respectfully submitted that all outstanding objections and rejections have been overcome and/or rendered moot. And further, that all pending claims patentably distinguish over the prior art. Thus, there being no further outstanding objections or rejections, the application is submitted as being in condition for allowance which action is earnestly solicited.

If the Examiner has any remaining issues to be addressed, it is believed that prosecution can be expedited by the Examiner contacting the undersigned attorney for a telephone interview to discuss resolution of such issues.

If there are any underpayments or overpayments of fees associated with the filing of this Amendment, please charge and/or credit the same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date: February 29, 2008 By: Darleen J. Stockley
Darleen J. Stockley
Registration No. 34,257

1201 New York Avenue, N.W.
Suite 700
Washington, D.C. 20005
Telephone: (202) 434-1500
Facsimile: (202) 434-1501